REMARKS

The Examiner is thanked for the performance of a thorough search.

STATUS OF CLAIMS

Claims 1-4, 11-14, 22, and 26 have been amended.

Claims 21 and 23 have been cancelled.

Claims 27-42 have been added.

No claims have been withdrawn.

Claims 1-20, 22, and 24 -42 are currently pending in the application.

The following table indicates which of the claims have similar corresponding features, which may be useful when renumbering the claims.

Set A	Method Claims 1-6	Medium Claims 11-16	Apparatus Claims 22, 27-31	System Claims 26, 38-42
Set B	Method Claims 7-10	Medium Claims 17-20	Network Device Claims 24, 32-34	System Claims 25, 35-37

SUMMARY OF THE REJECTIONS/OBJECTIONS

Claims 1, 11, 21-22 and 26 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent Number 6,304,912 issued to Oguchi et al. (" *Oguchi* ").

Claims 7-10, 17-20, and 23-25 have been allowed.

Claims 2-6 and 12-16 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The rejections are respectfully traversed.

RESPONSE TO REJECTIONS BASED ON THE PRIOR ART

Claims 1, 11, 21, and 22 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by *Oguchi*. The rejection is respectfully traversed.

A. CLAIM 1

Claim 1 features:

"A method of determining a Layer 2 path between a source device and a destination device in a switched network, the method comprising the computer-implemented steps of:

determining a Layer 3 path between the source device and the destination device, wherein the Layer 3 path comprises information identifying two or more Layer 3 devices;

determining a subpath for **each contiguous pair of Layer 3 devices** in the Layer 3 path, based on ***a spanning tree that is associated with a relevant VLAN*** for said each contiguous pair of Layer 3 devices; and

concatenating the **subpaths** to result in creating and storing information representing the Layer 2 path." (emphasis added).

Thus, as amended herein, Claim 1 features "determining a subpath for **each contiguous pair of Layer 3 devices** in the Layer 3 path, based on ***a spanning tree that is associated with a relevant VLAN*** for said each contiguous pair of Layer 3 devices." The amendment to Claim 1 adds the feature of "determining a subpath...based on ***a spanning tree that is associated with a relevant VLAN***", which is similar to allowed Claims 2 and 4 in that Claims 1 as amended herein and Claims 2 and 4 all feature "***a spanning tree that is associated with a relevant VLAN***".

In addition, as explained previously in the reply to the previous Office Action, Claim 1 features concatenating two or more subpaths based on the subpath for each contiguous pair of Layer 3 devices because at least two subpaths must be determined in the second step of "determining a subpath..." so that concatenation can occur in the third step of "concatenating the subpaths..." If there was only one subpath, there would be nothing to concatenate. Furthermore, each subpath corresponds to a contiguous pair of Layer 3 devices, such that concatenating the subpaths to create the Layer 2 path corresponds to the path among the Layer 3 devices. In contrast, *Oguchi* discloses an approach for determining whether there is a Layer 2 path between two Layer 3 devices such that a "virtual connection" or "shortcut" can be established so as to avoid having to pass through Layer 3 devices. (See Col. 3, lines 19-28;

Abstract.) Specifically, *Oguchi* merely discloses an approach for determining whether a Layer 2 path between the source host and the destination host exists that *bypasses* the Layer 3 devices such as the routers. (Col. 4, lines 48-63; emphasis added.) *Oguchi* fails to disclose, teach, suggest, or in any way render obvious determining multiple subpaths corresponding to **contiguous pairs** of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN and **concatenating** the subpaths thus determined, as featured in Claim 1.

The approach of *Oguchi* is to determine whether two communications apparatuses are reachable via Layer 2 devices only, so as to determine whether a Layer 2 "shortcut" can be established between the communication apparatuses to avoid having to pass through the Layer 3 devices, such as routers. (See Col. 3, lines 19-28; Abstract.) In particular, a review of Figures 17-36 of *Oguchi*, as cited in the "Response to Arguments" portion of the Final Office Action, fails to show a single example of subpaths between contiguous pairs of Layer 3 devices, little less the concatenation of such subpaths, as featured in Claim 1. As explained more fully below, the tables illustrated in Figures 17-36, such as Figures 28A through 31C, fail to show any path information (e.g., Figures 28A -28C merely show network identifiers for interfaces and Figures 29, 30A, 30B, and 31A-31C show message contents for determining the reachability for a destination host).

As for the network diagrams among Figures 17-36, in Figure 26 of *Oguchi*, a shortcut path labeled "DP1" connects H1 and H2 ,and thus H1 and H2 are "L2-reachable," but Figure 26 clearly and unambiguously illustrates that "DP1" does not connect with routers R1, R2, and R3. Similarly, in Figure 32 of *Oguchi*, a shortcut path labeled "DP2" connects H1 and H2, and thus H1 and H2 are "L2-reachable," but Figure 32 clearly and unambiguously illustrates that "DP2" does not connect with routers R1', R2', R3, R4', and R5'. Finally, in Figure 37 of *Oguchi*, no shortcut path is shown, and thus H1 and H2 are *not* "L2-reachable" because any Layer 2 path between H1 and H2 would have to pass through routers R3'' and R5''.

A comparison of Figure 37 of *Oguchi* to Figures 26 and 32 illustrates the fundamental difference between the approach of *Oguchi* and Claim 1. The reason why Figure 37 lacks any paths, such as DP1 or DP2 in Figures 26 and 32, respectively, is that in the network configuration shown in Figure 37, H2 is not "L2-reachable" from H1 because any path between H1 and H2 must pass through the Layer 3 devices R3'' and R5''. If the Final Office Action were correct in stating that *Oguchi* discloses "determining a subpath for **each**

contiguous pair of Layer 3 devices in the Layer 3 path" and "**concatenating** the **subpaths** to result in creating and storing information representing the Layer 2 path" as featured in Claim 1, then *Oguchi* would show and describe such subpaths in Figure 37. And while Figures 26 and 32 show a single subpath between H1 and H2 (e.g., the Layer 2 "shortcut"), Figures 26 and 32 both fail to show subpaths between contiguous pairs of Layer 3 devices, as featured in Claim 1.

This difference can best be illustrated by an example in which the approach of Claim 1 is applied to a network such as that illustrated in Figure 37 of *Oguchi*. In such an example, H1 could be considered to be the source device and H2 to be the destination device. In "determining a Layer 3 path..." as featured in Claim 1, the Layer 3 path would be from H1 to R3'' to R5'' to H2, and the contiguous pairs of Layer 3 devices would be H1-R3'', R3''-R5'', and R5''-H2. Thus, in "determining a subpath for each contiguous pair of Layer 3 devices..." as featured in Claim 1, a subpath would be determined between H1 and R3'', between R3'' and R5'', and between R5'' and H2. Finally, in "concatenating the subpaths...", the three subpaths would be concatenated to determine the Layer 2 path from H1 to H2 through R3'' and R5'', and as a result, the Layer 2 path thus determined would pass through both R3'' and R5''. However, *Oguchi* fails to disclose subpaths between H1 and R3'', between R3'' and R5'', and R5'' and H2 in regards to Figure 37. Similarly, in Figures 26 and 32 of *Oguchi*, the only path shown is from H1 to H2, which at best is a single path, and thus Figures 26 and 32 of *Oguchi* fail to show two or more subpaths that correspond to contiguous pairs of Layer 3 devices, little less the concatenation of those subpaths, as featured in Claim 1.

In the "Response to Arguments," the Final Office Action states that "Oguchi clearly discloses a step of *determining a subpath for each contiguous pair of router devices such as R1 and R2 and R2 and R3* by determining if they are reachable by layer 2 address or not and storing this information into a routing table with a search key to be used for retrieving it from the routing table 'read creating and storing the layer 2 path by link the subpaths between the layer 3 devices' for routing the packet via these networks (Figs 17-36, the information is created and stored for using to route the packet in layer 2 path by determining a subpath 'layer 2 path of the contiguous devices in the layer 3 path' and link these path by search key); See col. 1, lines 52-67, col. 10, lines 32-43, col. 11, lines 37 to col 12, lines 23, etc." (Emphasis added).

However, contrary to the assertion of the Final Office Action, *Oguchi* does not show determining a subpath between contiguous pairs of router devices such as R1 and R2 and R2 and R3, nor does *Oguchi* show determining whether the routers are reachable via a Layer 2 address. Of course, any Layer 3 device is reachable via a Layer 2 path, but the approach of *Oguchi* is to determine whether the end point communication apparatuses, such as H1 and H2, are reachable via a Layer 2 path alone that avoids any Layer 3 devices such as the routers R1, R2, and R3. In addition, a careful reading of these portions of *Oguchi* cited in the "Response to Arguments" of the Final Office Action shows that *Oguchi* fails to show "determining a subpath for **each contiguous pair of Layer 3 devices** in the Layer 3 path," little less that such a determining step if "based on ***a spanning tree that is associated with a relevant VLAN*** for said each contiguous pair of Layer 3 devices" as featured in Claim 1.

For example, the Final Office Action cites Col. 1, lines 52-67, but this portion of *Oguchi* fails to disclose anything relating to determining subpaths between contiguous pairs of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN, as featured in Claim 1. In fact, *Oguchi* says exactly the *opposite* when explaining that "a layer-3 communication path *passing* a portion or all of the at least one router can be determined by the portion or all of the at least one router based on a layer-3 address of the second communication apparatus." (Col. 1, lines 59-62; emphasis added). Thus, this portion of *Oguchi* as cited in the Final Office Action is consistent with all the other portions of *Oguchi* in explaining that the goal of *Oguchi* is to determine a Layer 2 path that avoids or "*passes*" the Layer 3 devices, and thus does not disclose "determining a subpath for each contiguous pair of Layer 3 devices in the Layer 3 path, based on a spanning tree that is associated with a relevant VLAN for said each contiguous pair of Layer 3 devices," as featured in Claim 1.

As another example, the Final Office Action cites Col. 10, lines 32-43, but this portion of *Oguchi* fails to disclose anything relating to determining subpaths between contiguous pairs of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN, as featured in Claim 1. In fact, this cited portion of *Oguchi* says nothing about any paths, and instead this portion of *Oguchi* merely states that two communication apparatuses can communicate "when the first communication apparatus and the at least one second communication apparatus are connected to a network which is logically divided into a plurality of subnetworks based on network-layer addresses." (Col. 10, lines 34-39). Again, this cited portion of *Oguchi* is consistent with the overall goal of *Oguchi* in determining

whether a Layer 2 shortcut path can be established between two communications apparatus that avoids any Layer 3 devices, and thus does not disclose "determining a subpath for each contiguous pair of Layer 3 devices in the Layer 3 path, based on a spanning tree that is associated with a relevant VLAN for said each contiguous pair of Layer 3 devices" as featured in Claim 1.

As yet another example, the Final Office Action cites Col. 11, line 37 through Col. 12, line 23, but this portion of *Oguchi* fails to disclose anything relating to determining subpaths between contiguous pairs of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN, as featured in Claim 1. This portion of *Oguchi* merely describes the comparison of "subnetwork address portions" that are stored in tables to determine whether a "first subnetwork address portion coincides with the second subnetwork address portion" (Col. 12, lines 11-13), which if true, indicates that two communications apparatuses can be reached via a Layer 2 path without having to go through a Layer 3 device, such as the routers that link subnetworks. Once again, this cited portion of *Oguchi* is consistent with the overall goal of *Oguchi* in determining whether a Layer 2 shortcut path can be established between two communications apparatus that avoids any Layer 3 devices, and thus does not disclose "determining a subpath for each contiguous pair of Layer 3 devices in the Layer 3 path, based on a spanning tree that is associated with a relevant VLAN for said each contiguous pair of Layer 3 devices" as featured in Claim 1.

To summarize, in the "Response to Arguments," the Final Office Action asserts that "Oguchi clearly discloses a step of *determining a subpath for each contiguous pair of router devices such as R1 and R2 and R2 and R3*...", yet none of the portions of *Oguchi* cited in the Final Office Action disclose determining a subpath between a contiguous pair of routers, and in fact, as explained above, all the cited portions show just the opposite, namely whether a Layer 2 path exists that avoids the Layer 3 devices, such as the routers R1, R2, and R3. Thus, the cited portions of *Oguchi* fail to disclose, teach, suggest, or in any way render obvious determining multiple subpaths corresponding to **contiguous pairs** of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN and **concatenating** the subpaths thus determined, as featured in Claim 1.

In addition, in the rejections of Claim 1, the Final Office Action states that *Oguchi* discloses "determining a subpath for each contiguous pair of Layer 3 devices in the Layer 3 path (Fig 17, Ref SS2-4 used to determine a subpath between the adjacent layer 3 devices can

be establish by layer 2 or not)." Also, the Final Office Action states that *Oguchi* discloses "concatenating the subpaths to result in creating and storing information representing the Layer 2 path (Fig 17, Ref L2-reachable, if the L2 reachable, then storing the layer 3 address with layer 2 address in the routing table, See Fig 28)."

However, the portions of *Oguchi* cited in the Final Office Action merely describe determining whether two communication apparatuses can communicate via a Layer 2 path only, thereby avoiding any Layer 3 devices. For example, *Oguchi* states in paragraph (24) of the "SUMMARY OF INVENTION" (which is referred to in discussing Fig. 17 in Col. 50, lines 3-8, stating that steps (a), (b), (c), and (d) of paragraph (24) correspond to steps SS1, SS2, SS3, and SS4 in Fig. 17): "[T]here is provided a process for determining layer-2 reachability between first and second communication apparatuses each connected to a layer-3 communication network comprised of at least one router and a plurality of subnetworks logically defined over at least one layer-2 connected communications network....to thereby determine whether or not the first and second communication apparatuses can communicate with each other by using a layer-2 communication path only." (Col. 18, lines 59-65, and Col. 19, lines 17-20). This portion of *Oguchi* discloses nothing about concatenating two or more subpaths based on the subpath that is determined for each contiguous pair of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN, as featured in Claim 1.

Step SS2 in Fig. 17 is "Identify first L2-connected network to which first interface belongs, where first router is connected with first communication apparatus through first interface" which discloses nothing about concatenating two or more subpaths based on the subpath that is determined for each contiguous pair of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN, as featured in Claim 1.

Step SS3 is "Identify second L2-connected network to which second interface belongs, where second router is connected with second communication apparatus through second interface," which discloses nothing about concatenating two or more subpaths based on the subpath that is determined for each contiguous pair of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN, as featured in Claim 1.

Step SS4 is "First and second L2-connected networks are same?" According to the surrounding information for Step SS4 in Fig. 17, if the first and second L2-connected networks are the same, the first communication apparatus and the second communication

apparatus are considered "L2-Reachable", and if they are not the same, they are considered "L2-Unreachable," which again discloses nothing about concatenating two or more subpaths based on the subpath that is determined for each contiguous pair of Layer 3 devices based on a spanning tree that is associated with a relevant VLAN, as featured in Claim 1.

Even taking all of steps SS2-SS4 together of Fig. 17, what *Oguchi* discloses is determining whether, for two communication apparatuses, a Layer 2 path exists that avoids Layer 3 devices. At best this might be characterized as determining whether a single Layer 2 path exists that avoids any Layer 3 devices. However, there is nothing in Fig. 17 or the related portions of *Oguchi* about determining **two or more subpaths** between **contiguous pairs of Layer 3 devices**, ***based on a spanning tree that is associated with a relevant VLAN***, little less **concatenating two or more subpaths** to create and store information representing a Layer 2 path, as featured in Claim 1.

In fact, there is nothing in *Oguchi* about creating and storing Layer 2 path information; rather in *Oguchi* information is just stored about interface network information (e.g., which network a particular interface is connected to, see Figs. 28A-28C) and there are examples of message contents for determining reachability for a destination host (see Figs. 29, 30A, 30B, and 31A-31C). In addition, the Office Action states with respect to the step of "concatenating..." of Claim 1, "if the L2 reachable, then storing the layer 3 address with layer 2 address in the routing table, See Fig 28." However, Figs. 28A, 28B, and 28C "illustrate as example contents of the interface-network correspondence information storing unit 1002. FIG. 28A illustrates an example of contents of the interface-network correspondence information for the interfaces R1-A and R1-B of the router R1 in the configuration of FIG. 26," and similarly Fig. 28B for interfaces R2-A and R2-B of router R2 and FIG. 28C for interfaces R3-A and R3-B of router R3. (Col. 59, lines 23-34). There is no Layer 2 path information in Figs. 28A-28C, nor is there any Layer 2 path information in the example message contents of Figs. 29, 30A, 30B, and 31A-31C.

Furthermore, *Oguchi* teaches away from the approach of Claim 1 because *Oguchi* focuses on determining whether a Layer 2 path exists that avoids Layer 3 devices while Claim 1 features determining a Layer 2 path by concatenating the subpaths between two or more pairs of contiguous Layer 3 devices based on the Layer 3 path. This can be seen clearly by comparing Fig. 32 and Fig. 37 of *Oguchi*. Fig. 32 illustrates an example in which H2 is "reachable" from H1 via the Layer 2 shortcut DP2, thereby avoiding any Layer 3 devices,

such as routers R1' - R5'. Fig. 37 illustrates an example in which H2 is "not reachable" from H1 via a Layer 2 shortcut because any communication must pass through both router R3'' and R5''.

In contrast to *Oguchi*, the approach of Claim 1 applies to both the networks illustrated in Fig. 32 and Fig. 37. For example, in Fig. 37, assume that the Layer 3 path is H1, R3'', R5'', and H2. Then the first pair of contiguous Layer 3 devices would be H1 and R3'', for which a subpath is determined. Similarly, additional subpaths between R3'' and R5" and also between R5'' and H2 would be determined. The three resulting subpaths can then be concatenated to find the Layer 2 path between H1 and H2 based on the Layer 3 path of H1, R3'', R5'', and H2.

Similarly, a Layer 2 path can be determined in Fig. 32 for a given Layer 3 path that encompasses at least two pairs of contiguous Layer 3 devices. For example, if the Layer 3 path in Fig. 32 were H1, R2', R3, R4', and H2, then subpaths would be determined the following contiguous pairs of Layer 3 devices: H1 and R2', R2' and R3, R3 and R4', and finally R4' and H2. Note that since there would be at least two subpaths, the Layer 2 path thus determined by the approach of Claim 1 would not correspond to the shortcut DP2 determined by the approach of *Oguchi* in Fig. 32.

While *Oguchi* discloses ascertaining whether a Layer 2 path exists between a source host and a destination host (e.g., determining whether the latter is "reachable" from the former via Layer 2 devices alone, thereby avoiding Layer 3 devices), *Oguchi* does not disclose, teach, suggest, or in any way render obvious "determining a subpath for **each contiguous pair of Layer 3 devices** in the Layer 3 path, based on ***a spanning tree that is associated with a relevant VLAN*** for said each contiguous pair of Layer 3 devices" and "concatenating the **subpaths** to result in creating and storing information representing the Layer 2 path" as feature in Claim 1.

Because *Oguchi* fails to disclose, teach, suggest, or in any way render obvious concatenating two or more subpaths based on the subpath for each contiguous pair of Layer 3 devices that are determined based on a spanning tree that is associated with a relevant VLAN, the Applicant respectfully submits that, for at least the reasons stated above, Claim 1 is allowable over the art of record and is in condition for allowance.

B. CLAIMS 11, 22, AND 26

Claims 11, 22, and 26 contain features that are similar to those described above with respect to Claim 1, and in particular Claims 11, 22, and 26 feature both "determining a subpath for **each contiguous pair of Layer 3 devices** in the Layer 3 path, based on ***a spanning tree that is associated with a relevant VLAN*** for said each contiguous pair of Layer 3 devices" and "concatenating the **subpaths** to result in creating and storing information representing the Layer 2 path" as in Claim 1. Therefore, based on at least the reasons stated above with respect to Claim 1, the Applicant respectfully submits that Claims 11, 22, and 26 are allowable over the art of record and are in condition for allowance.

RESPONSE TO THE OBJECTIONS

Claims 2-6 and 12-16 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. As discussed above, the Applicant respectfully submits that the rejection of Claims 1 and 11 have been traversed, and therefore the objection to Claims 2-6 and 12-16 has been rendered moot.

CONCLUSION

The Applicant believes that all issues raised in the Office Action have been addressed and that allowance of the pending claims is appropriate. Entry of the amendments and further examination on the merits are respectfully requested.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

To the extent necessary to make this reply timely filed, the Applicant petitions for an extension of time under 37 C.F.R. § 1.136.

If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,
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